In re Application of: Eran FINE
Serial No.: 10/538,173
Filed: August 7, 2006
Office Action Mailing Date: February 10, 2009

Examiner: Omar R. Rojas
Group Art Unit: 2874
Attorney Docket: 30063

In the Claims:

1-89. (Cancelled)

90. (Currently Amended) A flexible waveguide capable of propagating and emitting light, comprising:

a flexible multilayered material shaped as a sheet and having a plurality of particles distributed in said flexible material in an increasing concentration such that a first portion of the light is scattered by said particles and emitted through at least a portion of a surface of said sheet to provide a light gradient emanating from said surface;

wherein at least one layer of said multilayered material is configured such that light is emitted through one surface of said sheet while another surface remains opaque;

wherein said flexible material comprises a first layer having a first refractive index, and a second layer being in contact with said first layer and having a second refractive index being larger that said first refractive index and wherein said particles are distributed in said first layer and said second layer.

91. (Previously Presented) The waveguide of claim 90, wherein said flexible material is elastic.

92. (Previously Presented) The waveguide of claim 91, wherein said flexible material is characterized by an elasticity of at least 100 %.

93. (Previously Presented) The waveguide of claim 91, wherein said flexible material is characterized by tensile set value of less than about 5 %.

94. (Previously Presented) The waveguide of claim 92, wherein said flexible material is transparent.

95. (Previously Presented) The waveguide of claim 90, wherein said flexible material comprises a polymeric material.

96. (Previously Presented) The waveguide of claim 95, wherein said polymeric material comprises a rubbery material.

97-100. (Cancelled)

101. (Previously Presented) The waveguide of claim 90, wherein said flexible material comprises a dielectric material, and further wherein a reflection coefficient of said dielectric material is selected so as to allow propagation of polarized light through the waveguide, and emission of said polarized light through said surface of the waveguide.

102. (Cancelled)

103. (Cancelled)

104. (Currently Amended) The waveguide of claim ~~103~~90, wherein at least one of: a thickness of said first layer, a thickness of said second layer, said first refractive index and said second refractive index, is selected so that the light propagates at a predetermined propagation angle.

105. (Currently Amended) The waveguide of claim ~~103~~104, wherein said propagation angle is from about 5 degrees to about 30 degrees.

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106. (Currently Amended) The waveguide of claim ~~103~~90, wherein said second layer comprises polyisoprene.

107. (Currently Amended) The waveguide of claim ~~103~~90, wherein said flexible material further comprises a third layer for being in contact with said second layer and having a third refractive index being smaller than said second refractive index.

108. (Currently Amended) The waveguide of claim ~~103~~90, wherein said at least a portion of said surface comprises a predetermined pattern.

109. (Currently Amended) The waveguide of claim ~~103~~90, wherein at least one of said first and said second layers comprises at least one additional component designed and configured so as to allow said emission of the light through said at least a portion of said surface and capable of producing different optical responses to different wavelengths of the light.

110. (Previously Presented) The waveguide of claim 109, wherein said different optical responses comprises different emission angles or different emission wavelengths.

111. (Previously Presented) The waveguide of claim 107, wherein said third layer comprises at least one additional component designed and configured so as to allow said emission of the light through said at least a portion of said surface.

112-113. (Cancelled)

114. (Previously Presented) The waveguide of claim 111, wherein said at least one additional component comprises at least one diffractive optical element, said

at least one diffractive optical element being for diffracting said first portion of the light to thereby emit said first portion through said at least a portion of said surface.

115. (Previously Presented) The waveguide of claim 114, wherein said at least one diffractive optical element is selected from the group consisting of a non-smooth surface of said second layer, a mini-prism and a diffraction grating.

116. (Previously Presented) The waveguide of claim 114, wherein a location of said at least one diffractive optical element is selected such that said first portion of said light is emitted from a predetermined region of said surface area.

117. (Previously Presented) The waveguide of claim 116, wherein said predetermined region of said surface area comprises a predetermined pattern.

118. (Previously Presented) The waveguide of claim 115, wherein said at least one diffractive optical element is designed and constructed to selectively diffract a predetermined range of wavelengths of the light.

119. (Previously Presented) The waveguide of claim 111, wherein said at least one additional component comprises at least one region of high refractive index, present in said first layer and/or in said third layer, said high refractive index being selected such that said portion of said light is emitted through said at least a portion of said surface.

120. (Previously Presented) The waveguide of claim 119, wherein a location of at least one region of said high refractive index is selected such that said first portion of said light is emitted from a predetermined pattern of said surface area.

121-122. (Cancelled)

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123. (Currently Amended) A method of providing illumination, the method comprising:

providing a flexible multilayered material shaped as a sheet and having a plurality of particles distributed in said flexible material in an increasing concentration; and

propagating light through said flexible material so as to provide a light gradient emanating only from one surface of said sheet;

wherein said flexible material comprises a first layer having a first refractive index, and a second layer being in contact with said first layer and having a second refractive index being larger that said first refractive index, and wherein said particles are distributed in said first layer and said second layer.

124-126. (Cancelled)

127. (Previously Presented) The waveguide of claim 90, wherein said a size of said particles is selected so as to selectively scatter a predetermined range of wavelengths of the light.

128. (Previously Presented) The waveguide of claim 90, wherein said plurality of particles is selected for filtering out particular wavelengths of the light.

129-130 (Cancelled)

131. (New) The waveguide of claim 90, wherein said a plurality of particles comprises at least one type of particles selected from the group consisting of fluorescent particles and beads having a combination of fluorophore molecules.

132. (New) A flexible waveguide capable of propagating and emitting light, comprising:

a flexible multilayered material shaped as a sheet and having a plurality of particles distributed in said flexible material in an increasing concentration such that a first portion of the light is scattered by said particles and emitted through at least a portion of a surface of said sheet to provide a light gradient emanating from said surface;

wherein at least one layer of said multilayered material is configured such that light is emitted through one surface of said sheet while another surface remains opaque;

wherein said flexible material comprises a first layer having a first refractive index and a second layer being in contact with said first layer and having a second refractive index being larger that said first refractive index, and wherein at least one of said first and said second layers comprises at least one additional component designed and configured so as to allow said emission of the light through said at least a portion of said surface and capable of producing different optical responses to different wavelengths of the light.

133. (New) The waveguide of claim 132, wherein said different optical responses comprises different emission angles or different emission wavelengths.

134. (New) A flexible waveguide capable of propagating and emitting light, comprising:

a flexible multilayered material shaped as a sheet and having a plurality of particles distributed in said flexible material in an increasing concentration such that a first portion of the light is scattered by said particles and emitted through at least a portion of a surface of said sheet to provide a light gradient emanating from said surface;

wherein at least one layer of said multilayered material is configured such that light is emitted through one surface of said sheet while another surface remains opaque;

wherein said flexible material comprises:

a first layer having a first refractive index,

a second layer being in contact with said first layer and having a second refractive index being larger that said first refractive index, and

a third layer being in contact with said second layer and having a third refractive index being smaller than said second refractive index, said third layer comprising at least one additional component designed and configured so as to allow said emission of the light through said at least a portion of said surface.

135. (New) The waveguide of claim 134, wherein said at least one additional component comprises at least one diffractive optical element, said at least one diffractive optical element being for diffracting said first portion of the light to thereby emit said first portion through said at least a portion of said surface.

136. (New) The waveguide of claim 135, wherein said at least one diffractive optical element is selected from the group consisting of a non-smooth surface of said second layer, a mini-prism and a diffraction grating.

137. (New) The waveguide of claim 135, wherein a location of said at least one diffractive optical element is selected such that said first portion of said light is emitted from a predetermined region of said surface area.

138. (New) The waveguide of claim 137, wherein said predetermined region of said surface area comprises a predetermined pattern.

139. (New) The waveguide of claim 136, wherein said at least one diffractive optical element is designed and constructed to selectively diffract a predetermined range of wavelengths of the light.

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140. (New) The waveguide of claim 134, wherein said at least one additional component comprises at least one region of high refractive index, present in said first layer and/or in said third layer, said high refractive index being selected such that said portion of said light is emitted through said at least a portion of said surface.

141. (New) The waveguide of claim 140, wherein a location of at least one region of said high refractive index is selected such that said first portion of said light is emitted from a predetermined pattern of said surface area.